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(54) **LOW TORQUE AND VACUUM SEED METER**

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A01C 7/10 (2006.01)

(52) **U.S. Cl.**
CPC .. ***A01C 7/046*** (2013.01); ***A01C 7/10*** (2013.01)

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USPC 111/177–185, 170
See application file for complete search history.

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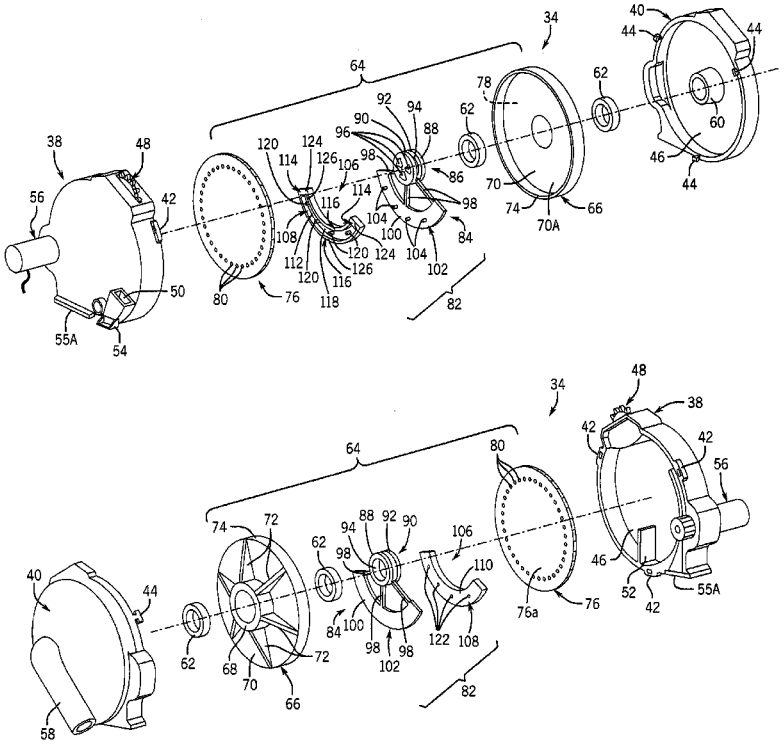
(57) **ABSTRACT**

A seed meter is provided for use with a row crop planter or seed planter that includes a seed disk assembly that rotates within a meter housing cavity and that has a seed disk assembly cavity in which a vacuum pressure is applied for pulling seeds into seed pockets of a seed disk of the seed disc assembly. The vacuum pressure is applied to the seed disk assembly by pulling a vacuum airflow through a spindle that supports the seed disk assembly. A wiper basket is arranged in a fixed position within the seed disk assembly cavity and seals against the seed disk assembly as a support plate and seed disk of the seed disk assembly rotate over the wiper basket, so that side walls of the wiper basket create a boundary between a vacuum zone and a non-vacuum zone inside of the seed disc assembly cavity.

16 Claims, 5 Drawing Sheets



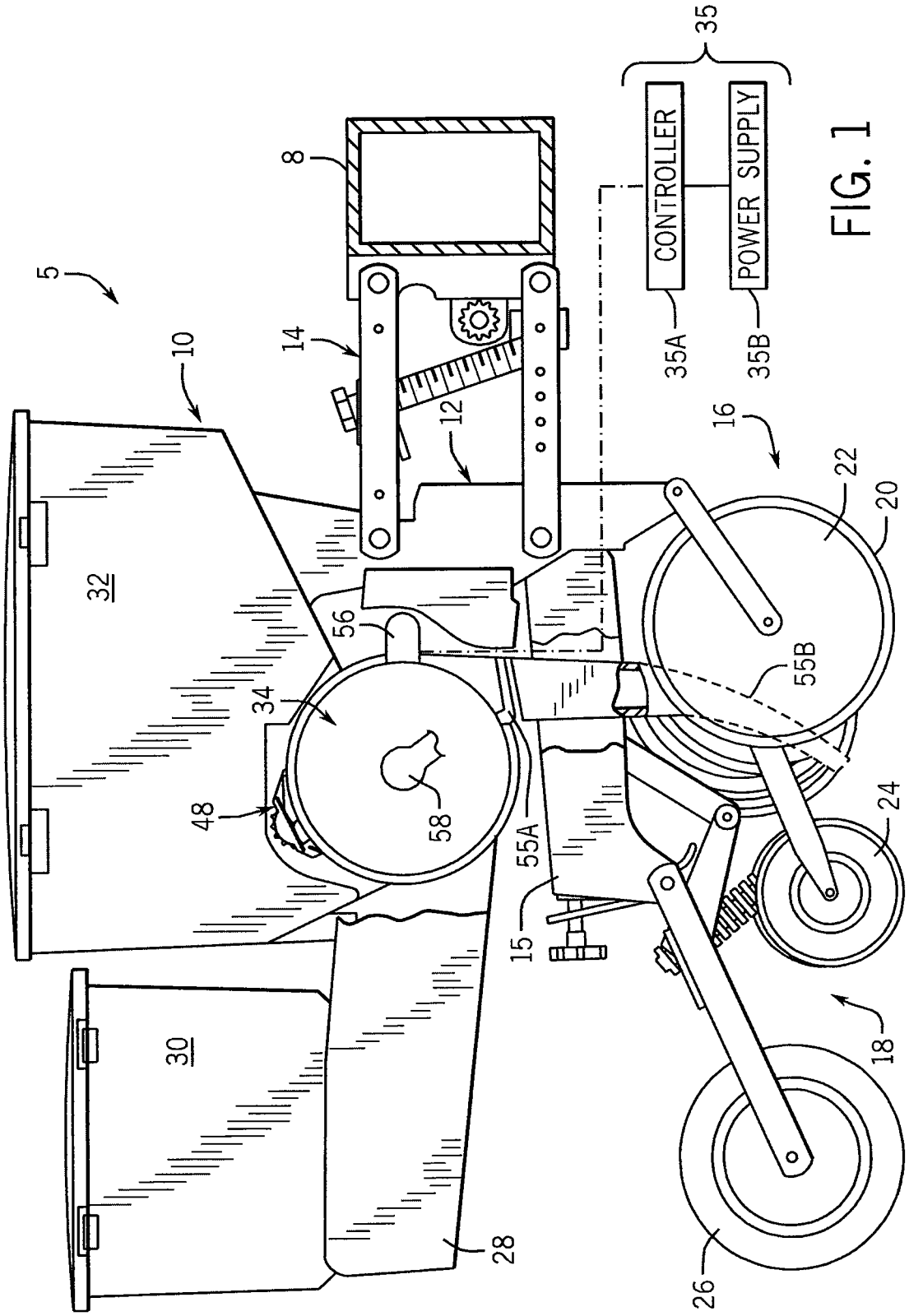

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FIG. 1

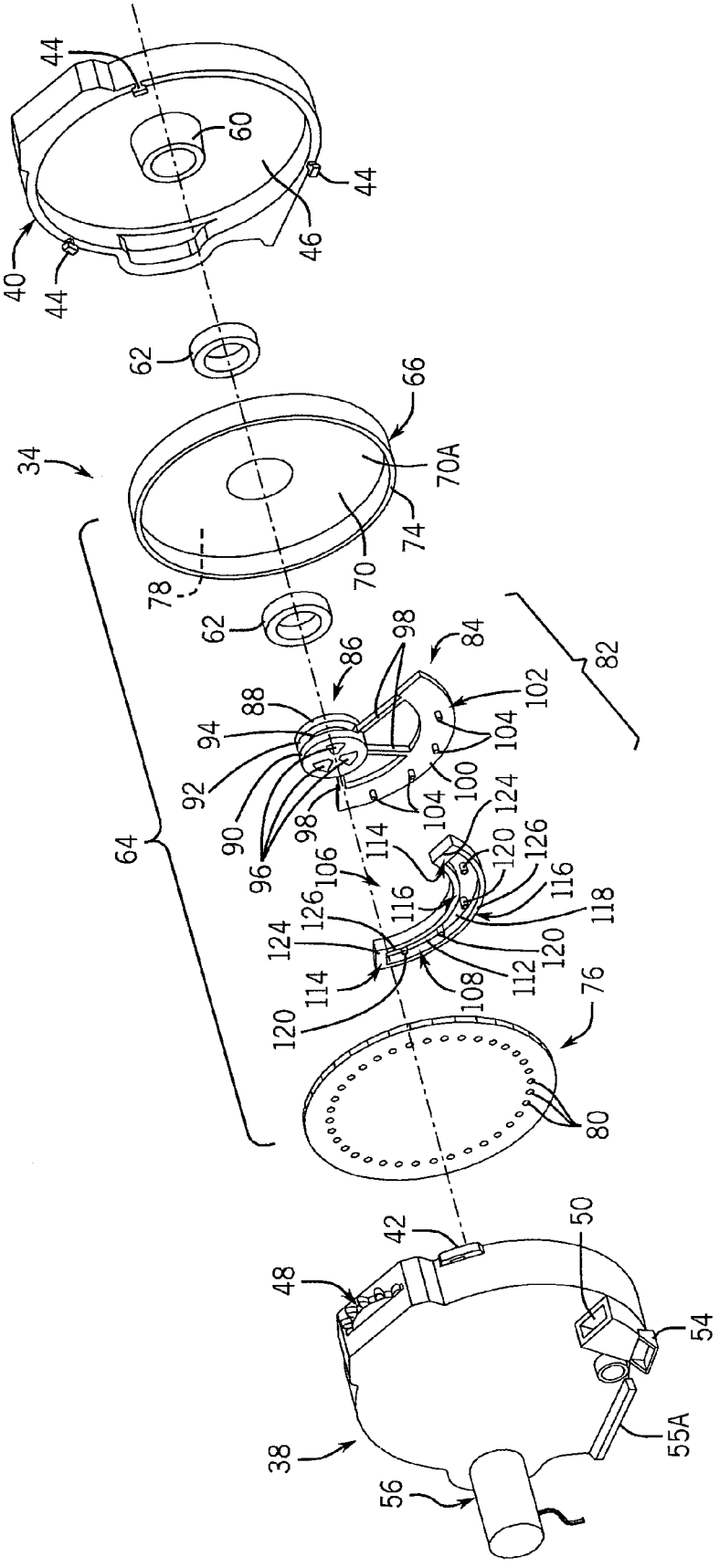
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FIG. 2

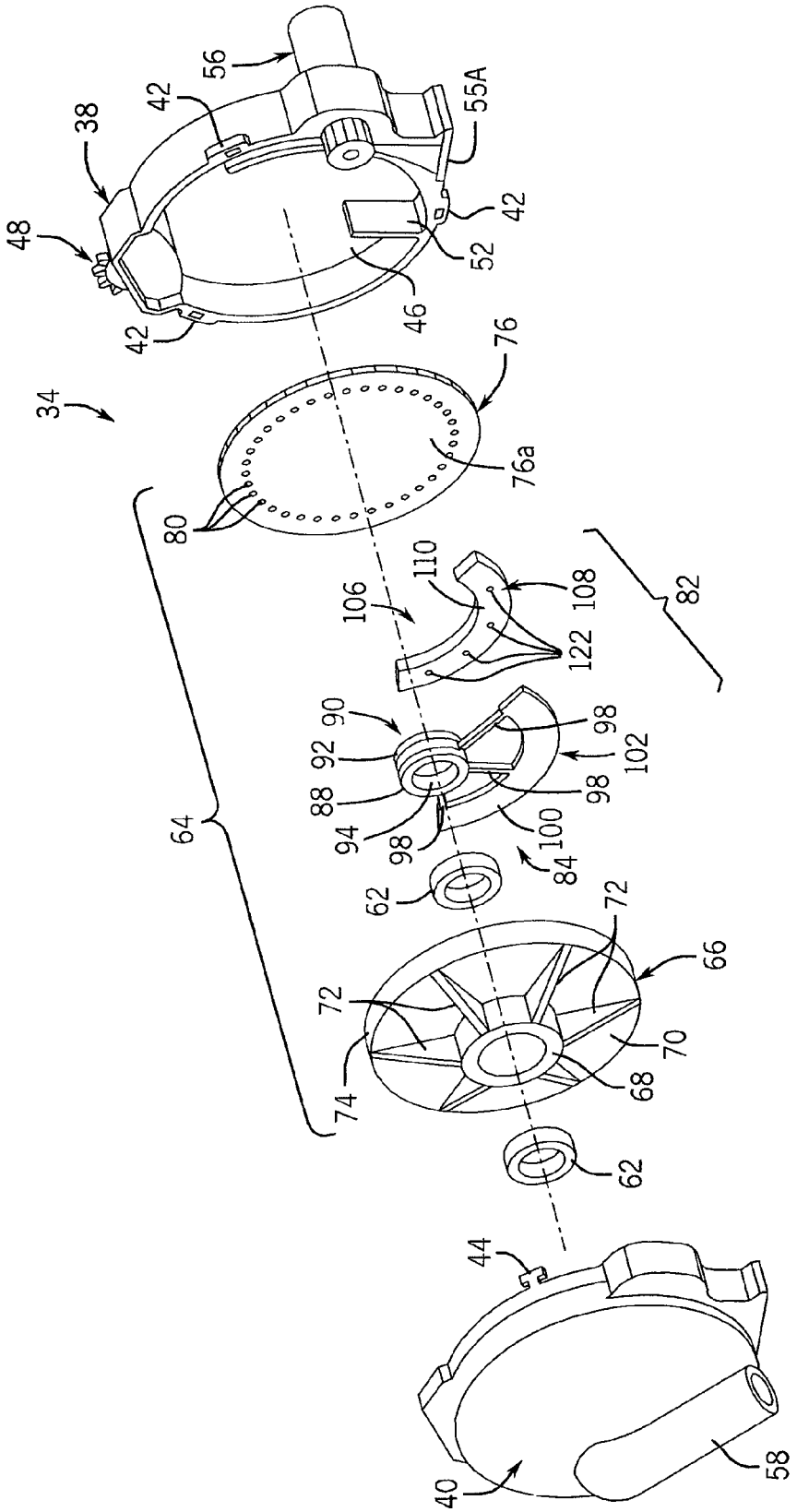
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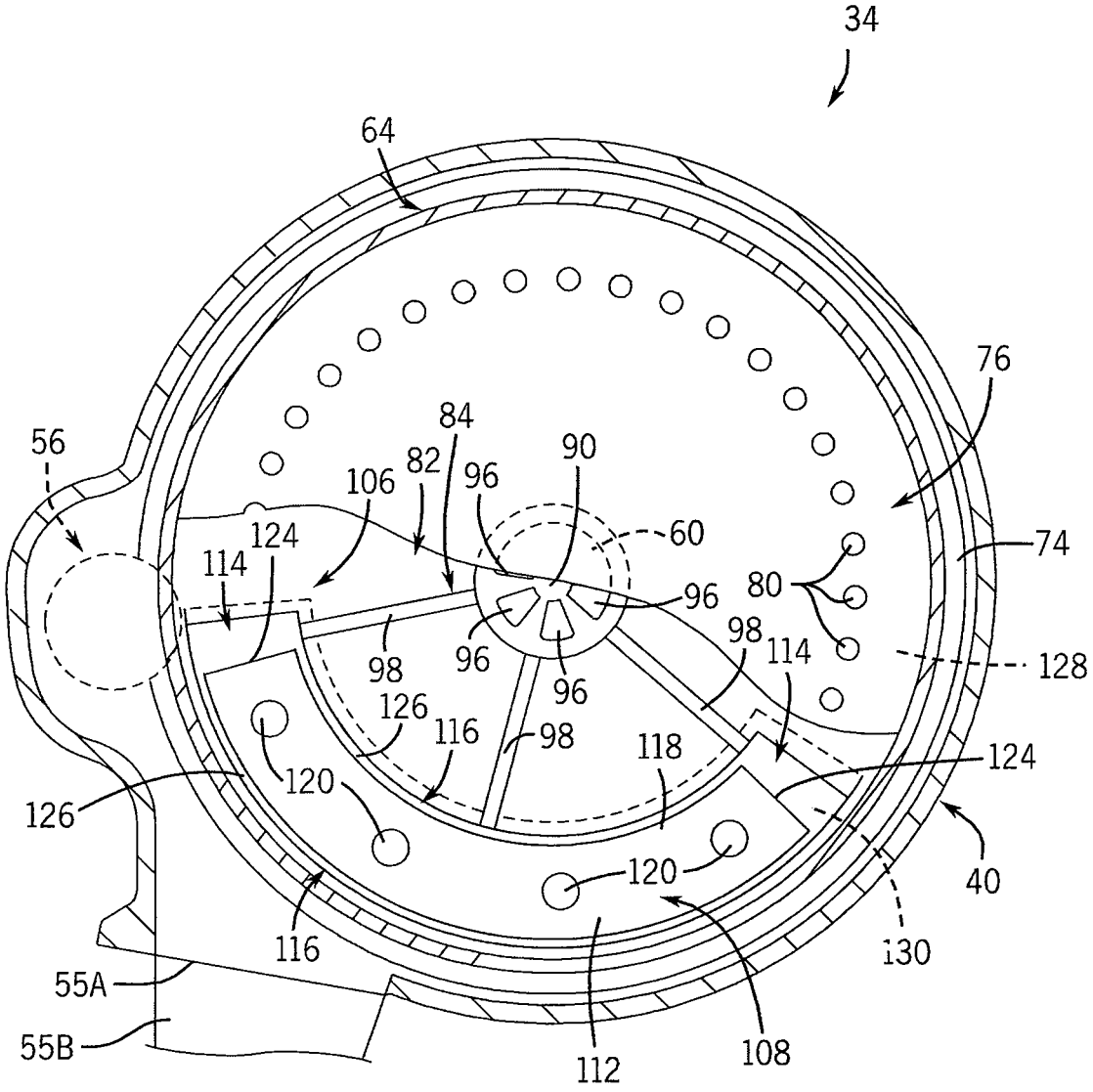
FIG. 3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55B
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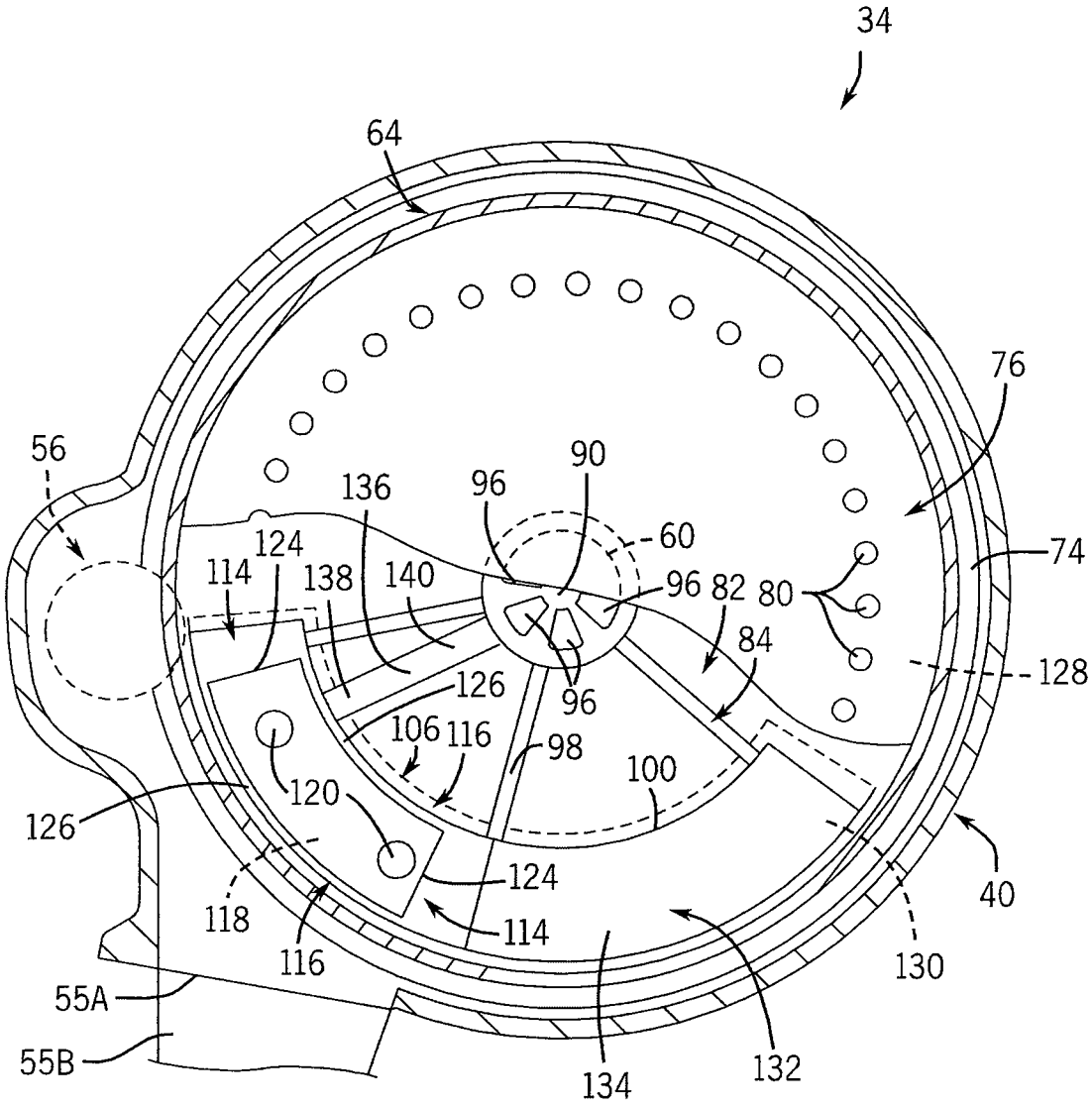
FIG. 4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130
55A
55B
134
132

FIG. 5

LOW TORQUE AND VACUUM SEED METER

FIELD OF THE INVENTION

The invention relates generally to row-crop planters or seeders and, in particular, to seed disk rotational mounting arrangements and air sealing assemblies for seed meters.

BACKGROUND OF THE INVENTION

Modern farming practices strive to minimize operating expenses. One way of reducing operating expenses is to operate the farm equipment at relatively faster speeds, which reduces the amount of operating time to complete certain tasks. When operating equipment at faster speeds, it can be important to maintain the quality of operation that can be achieved while operating at relatively slower operating speeds. This can be especially difficult to accomplish during planting and seeding operations that require precise seed depth placement and spacing accuracy in order to maintain a good seed environment. Accordingly, seed meter functionality can be very important in modern farming practices to obtain profitability.

Another way of reducing operating expenses is to use relatively more efficient farm equipment that requires less fuel to operate for a given operational time period when compared to less efficient equipment. Some seed meters create a negative pressure between a seed disk and a seed cover component of an outer housing of the seed meter. This tends to pull the seed disk against the seed cover outer housing component which creates a frictional braking force that must be overcome when rotating the seed disks of such typical seed meters. Attempts have been made to reduce those effects by providing seed meters with rotating vacuum chambers. Such seed meters apply a vacuum pressure to the entire inside space of the rotating vacuum chamber and require a complex array of numerous flexible fingers. Each flexible finger periodically bends to mechanically cover an individual opening of the seed disk to cut off vacuum to that opening, and has a wire that inserts into the opening to release the seed from the opening.

SUMMARY OF THE INVENTION

The present invention is directed to a seed meter which provides improved uniformity of seed placement during row crop planting and that is highly efficient so as to require relatively little power to operate when compared to less efficient seed meters. The seed meter may include a seed disk that is supported for low-drag rotation about a spindle by way of bearing assemblies. The seed disk, itself, may be connected to a seed disk hub in which the bearing assemblies are concentrically mounted for rotation about the spindle. The seed disk may be sealed at its outer periphery to the seed disk hub so that a space is provided between the seed disk and a back wall of the seed disk hub. A vacuum may be drawn through the center of the seed disk hub to create negative pressure in the space between the seed disk and seed disk hub back wall, for drawing seeds against the seed disk. In this way, the negative pressure of the seed meter is created within a rotating unitary seed disk assembly that is defined by the seed disk and the seed disc hub, which eliminates the seed disk from being drawn by vacuum against a stationary housing or other component of the seed meter. The fully sealed unit of the seed disk assembly may require relatively less input vacuum pressure to achieve sufficient vacuum pressure at each of multiple seed disk cells into which the seeds are drawn for being dispensed from the seed meter when compared to typical seed meters that have pressure differentials that are established across rotating components that engage fixed components of the seed meter, such as a seed disk and a fixed seed cover. The invention may therefore provide more efficient rotating assemblies that require less torque for rotating the seed disks and require less vacuum pressure to draw seeds against the seed disks so that the seed meters can be operated while using less power.

According to one aspect of the invention, a seed meter is provided that includes a housing assembly that includes a housing cavity therein and a seed disk assembly that is arranged for rotation inside of the housing cavity. The seed disk assembly includes a support plate that has a back wall and a seed disk that is mounted to the support plate so that the support plate back wall and seed disk are spaced from each other. A seed disk assembly cavity is defined in the space between the support plate back wall and seed disk. A wiper basket may be arranged within the seed disk assembly cavity and that engages an inwardly facing surface of the seed disk. This may create a seal that separates the seed disk assembly cavity into a vacuum zone in which a vacuum pressure is present in the seed disk assembly cavity for holding seeds against the seed disk and a non-vacuum zone in which the seeds are not held against the seed disk by vacuum pressure so that the seeds can freely fall away from the seed disk This may provide an arrangement in which there is no frictional braking between the seed disk and the outer fixed housing components of the seed meter, which may allow for rotating various components of a seed meter while requiring less torque to rotate the components.

According to another aspect of the invention, the wiper basket may include a basket cavity that may be defined between the interconnected side walls and a back wall of the wiper basket. The basket cavity may be vented to atmosphere which may be done with a vent tube that connects the basket cavity to an interior of the seed meter or outside the seed meter so as to provide the basket cavity with ambient or greater pressure at the non-vacuum zone.

According to another aspect of the invention, a blocking plate may be arranged adjacent the wiper basket. The blocking plate may include an outwardly facing surface that engages the inwardly facing surface of the seed disk so as to cover the holes through the seed disk at the non-vacuum zone. The blocking plate may be arranged downstream of the wiper basket. In this way, the blocking plate may block vacuum leakage through holes of the seed disk that are not covered by seeds in the seed pockets, after the seeds have fallen out of the seed pockets when aligned with the wiper basket that is vented to atmosphere through the wiper basket cavity.

Other aspects, objects, features, and advantages of the invention will become apparent to those skilled in the art from the following detailed description and accompanying drawings. It should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the present invention, are given by way of illustration and not of limitation. Many changes and modifications may be made within the scope of the present invention without departing from the spirit thereof, and the invention includes all such modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred exemplary embodiments of the invention are illustrated in the accompanying drawings in which like reference numerals represent like parts throughout.

FIG. **1** illustrates a side elevational view of a portion of a seed planter incorporating a seed meter in accordance with the present invention;

FIG. **2** illustrates an exploded pictorial view of the seed meter shown in FIG. **1** taken from above and behind the meter cover;

FIG. **3** illustrates an exploded pictorial view of the seed meter shown in FIG. **1** taken from above and behind the seed disk assembly cover;

FIG. **4** illustrates a partial cross-sectional view of the seed meter of FIG. **1** facing the meter cover; and

FIG. **5** illustrates a partial cross-sectional view, facing the seed disk, of a variant of the wiper basket assembly of FIG. **4**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings and specifically to FIG. **1**, a portion of a multiple row crop planter implement or seed planter **5** is shown. The seed planter **5** is typically pulled by a tractor or other traction device (not shown). Seed planter **5** includes a main frame **8** that holds multiple individual row planting units **10**, each row planting unit **10** being substantially identical. Only a single row planting unit **10** is shown for simplicity sake.

Still referring to FIG. **1**, row planting unit **10** includes a sub-frame **12** that is connected to the main frame **8** by way of a parallel linkage system **14**. The sub-frame **12** includes a backbone **15** that supports a furrow opening mechanism **16** and a furrow closing mechanism **18** that is arranged behind the furrow opening mechanism **16**. The furrow opening mechanism **16** includes an opener disk(s) **20** that penetrates the soil and creates a furrow and gauge wheel **22** that has a limited displacement relative to the opener disk(s) **20**. This allows the depth of the furrow to be selected by an operator by adjusting the amount of permitted movement of the gauge wheel **22** so as to control the depth to which the opener disk(s) **20** can penetrate the soil. The furrow closing mechanism **18** includes a closing disk(s) **24** that closes the furrow after the row planting unit **10** deposits seeds into the furrow and a press wheel **26** that rolls over the closed furrow to firm the soil over the seed to further close the furrow and promote favorable seed to soil contact.

Still referring to FIG. **1**, the sub-frame includes a shelf **28** that is arranged above and generally parallel to the backbone **15**. Shelf **28** is shown supporting an optional pesticide hopper **30** that contains, e.g., an herbicide or an insecticide, along with a known pesticide dispensing system (not shown) for applying controlled amounts of the contents in the desired location(s) while using the seed planter **5**. Shelf **28** also supports a seed hopper **32** that holds the seed supply for planting by the row planting unit **10**. The particular seed hopper **32** shown in FIG. **1** is configured to store the seed material row planting unit **10**. In another embodiment, the seed is held in bulk storage in a primary seed hopper at a remote location, spaced from the various row planting units **10**, whereby the seeds are supplied to the row planting units **10** pneumatically, or otherwise, through a seed conduit. Regardless of the particular configuration of seed hopper **32**, the seeds are directed from the seed hopper **32** to a seed meter **34**. A known vacuum source (not shown) is operably connected to a seed meter **34** for drawing a vacuum airflow to create a vacuum pressure inside of the seed meter **34**, as described in greater detail elsewhere herein. Seed meter **34** is operably connected to a control system **35** that includes a controller **35**A and power supply **35**B, as is known, for controlling the seed meter **34**. The controller **35**A can include an industrial computer or, e.g., a programmable logic controller (PLC), along with corresponding software and suitable memory for storing such software and hardware including interconnecting conductors for power and signal transmission for controlling electronic or electro-mechanical components of the system seed meter **34**.

Referring now to FIGS. **2** and **3**, the seed meter **34** includes a multi-component meter housing that supports the entire seed meter **34** and its components and temporarily holds the seed that is being metered. The multi-component meter housing includes a meter cover **38** and a seed disk assembly cover **40** that engage each other at respective outer peripheries. The meter cover **38** and seed disk assembly cover **40** include slots **42** and tabs **44** that engage each other upon rotation of the meter and seed covers **38**, **40** so as to secure the meter and seed disk assembly covers **38**, **40** together in a cam-locking-type manner. In another embodiment, latches (not shown) are provided on the meter and seed disk assembly covers **38**, **40** for securing the meter and seed disk assembly covers **38**, **40** together. When the meter and seed disk assembly covers **38**, **40** are secured together, the meter housing **38** defines an enclosure with a meter housing cavity **46** therein.

Referring to FIGS. **2** and **3**, a seed singulator **48** that is configured to inhibit more than one seed from being discharged from the seed meter **34** per seed discharge event is arranged on the meter housing **38**. A seed opening **50** (FIG. **2**) extends into the meter cover **38** and provides an entry through which the seed enters the seed meter **34** and is held in an area of the meter housing cavity **46** that is confined by a divider wall **52** (FIG. **3**) and seed disc **76**. A hinged cover door **54** (FIG. **2**) covers a seed clean-out exit hole (not shown) that can be pivoted open and serves as a funnel to clean out the seed meter **34** when it is not being used. A seed outlet **55**A directs the seed being delivered out of the seed meter **34** and to a seed tube **55**B (FIGS. **1** and **4**) for depositing the seed into a seed bed. A drive assembly **56** is mounted to the meter cover **38** for driving the rotating components of the seed meter **34**. Drive assembly **56** includes an electric motor and drive gear(s) and is operably connected to the control system **35** (FIG. **1**). A suitable drive assembly **56** is disclosed in commonly owned U.S. Pat. No. 7,617,785, entitled Direct Electric Drive Seed Meter, which is incorporated herein by reference in its entirety. It is understood that the drive assembly **56** may have other configurations to mechanically drive the seed meter **34**, such as drive shafts, chains and belts, peg and hole drive systems, and others.

Still referring to FIGS. **2** and **3**, vacuum inlet **58** (FIG. **3**) is connected by way of a vacuum supply hose (not shown) to the vacuum source. The vacuum inlet **58** (FIG. **3**) connects to a spindle **60** (FIG. **2**) that extends from an inwardly facing surface of the seed disk assembly cover **40**, axially into the meter housing cavity **46**. A pair of bearings **62** is arranged on the outer circumferential surface of the spindle **60** and supports a seed disk assembly **64** for rotation upon the spindle **60**. The disk assembly **64** can rotate upon and is sealed with respect to the spindle **60**, so that the vacuum source creates a vacuum pressure within the seed disk assembly **64**, while the meter housing cavity **46** remains substantially at an ambient pressure.

Referring to FIG. **3**, the seed disk assembly **64** includes a support plate **66** that has a hub **68** in which the bearings **62** are mounted, and a back wall **70** that is attached to an end of the hub **68**. Multiple support webs **72** extend between and connect an outer circumferential surface of the hub **68** to a rearward facing surface of the back wall **70**. Referring to FIG. **2**, a collar **74** extends in an axial direction from an outer perimeter of the support plate back wall **70**. A seed disk **76** is

mounted to the support plate collar **74** so that a seed disk assembly cavity **78** (FIG. **2**) is defined between an inwardly facing surface **70**A of the back wall **70** of the support plate **66** and an inwardly facing surface **76**A (FIG. **3**) of the seed disk **76**.

Referring again to FIGS. **2** and **3**, the seed disk **76** can be mounted to the support plate collar **74** by way of screws or other fasteners. This may allow the seed disk **76** to be removed from the support plate collar **74** for installation of another seed disk **76** so as to accommodate different seed disks **76** for planting different types of seed. The seed disk **76** has a geared outer circumferential surface, with radially extending gear teeth that intermesh with the drive gear(s) of the drive assembly **56**, which allows the seed disk assembly **64** to be rotated by the drive assembly **56**. In another embodiment, the drive assembly **56** rotates the seed disk assembly **64** by engaging and driving a geared surface provided on the support plate collar **74** or provided on the hub **68**. As is known, seed disk **76** includes seed pockets **80** that are discrete openings that include holes that extend between front and back surfaces and thus through the entire thickness of the seed disk **76**. The seed pockets **80** are spaced from each other and, in this embodiment, are arranged in a single circle-shaped pattern. In other embodiments of the seed disk **76** that are configured for planting relatively small seeds like soybeans and sorghum, relatively more seed pockets **80** are provided and are arranged in patterns of multiple concentric circles so that the seed pockets **80** occupy a relatively larger percentage of the surface area of the seed disk **76**.

Referring still to FIGS. **2** and **3**, a wiper basket assembly **82** is arranged within the seed disk assembly cavity **78**. The wiper basket assembly **82** remains in a fixed position within the seed meter **34** while the support plate **66** and the seed disk **76** rotate about the wiper basket assembly **82**. Wiper basket assembly **82** includes a bracket **84** with an upper end **86** that is supported by the spindle **60**. The upper end **86** includes a pair of side plates **88**, **90** that are spaced from each other within opening **92** defined between the side plates **88**, **90**. Side plate **88** includes a hole **94** (FIG. **3**) that fits over and seals against the spindle **60**. The side plate **90** can be spaced from the spindle **60** so that a vacuum airflow path can flow through the opening **92** between the plates **88**, **90** and into the opening of and through the spindle **60**, toward the vacuum source. In another embodiment, the spindle **60** abuts the side plate **90** and the vacuum airflow can be directed through openings **96** that extend through the side plate **90** so as to allow the airflow to flow into and through the spindle **60**.

Still referring to FIGS. **2** and **3**, arms **98** extend from the bracket upper end **86** toward a plate **100** that is arranged at a lower end **102** of the bracket **84**. The plate **100** is generally C-shaped in profile and has a perimeter with an outer edge that is curved and that is parallel to and spaced from the rim **74** of the support plate **66**. As shown in FIG. **2**, springs **104** are arranged between the plate **100** and a wiper basket **106** so that the springs **104** bias the wiper basket **106** to press against and engage an inwardly facing surface of the seed disk **76**.

Still referring to FIGS. **2** and **3**, the wiper basket **106** is generally C-shaped in profile, correspondent shaped at the bracket plate **100**. The wiper basket **106** includes a back wall **108** that has an inwardly facing surface **110** and outwardly facing surface **112**. The inwardly facing surface **110** of the wiper basket back wall **108** faces toward the bracket **84** and the outwardly facing surface **112** faces toward the seed disk **76**. Interconnected side walls, which are shown as a pair of short side walls **114** at ends of the wiper basket **106** and a pair of long side walls **116** at upper and lower portions of the wiper basket **106**, extend perpendicularly from an outer perimeter of the wiper basket back wall **108**. The long side walls **116** are curved and parallel to and spaced from each other and parallel to and spaced from the support plate collar **74** of the seed disk assembly **64**. A cavity **118** is defined within the wiper basket **106** and has a boundary defined by the back wall **108** and the side walls **114**, **116**. The wiper basket **106** has an opening that extends into the cavity **118** so that the cavity **118** is presented facing the inwardly facing surface of the seed disk **76**. Spring pockets **120** are arranged within the cavity **118** for holding the springs **104**. The spring pockets **120** extend from the back wall **108** as cylindrical projections into the cavity **118** with bores **122** (FIG. **3**) that receives the springs **104**. In this way, the springs **104** push the wiper basket **106** from various spaced apart locations toward the seed disk **76** so that edges **124**, **126** of the side walls **114**, **116**, respectively, engage the seed disk so as to create a seal between the seed disk **76** and the wiper basket **106**. In one embodiment, each of the edges **124**, **126** includes a seal that is made from a polymeric and/or an elastomeric material. In one embodiment, the springs **104** are not used for pushing the wiper basket **106** against the seed disk **76**, but instead this is done by way of the bracket **84** itself. In such embodiment, at least one of the bracket arms **98** is arranged to bias the wiper basket **106** toward the seed disk **76** so that the wiper basket **106** is pushed against the inwardly facing surface **76**A (FIG. **3**). This may be done by arranging the bracket arm(s) **98** to position the wiper basket **106** with a slight interference between the wiper basket **106** and the inwardly facing surface **76**A. In this way, the wiper basket **106** always engages the inwardly facing surface **76**A so as to deflect the bracket arm(s) **98** away from the **106** inwardly facing surface **76**A, whereby the deflected bracket arm(s) **98** provides a restorative biasing force toward the inwardly facing surface **76**A of the seed disk **76**.

Referring now to FIG. **4**, with the wiper basket **106** continuously engaging the inwardly facing surface of the seed disk **76**, the wiper basket **106** seals and separates a portion of the seed disk assembly cavity **78** away from the remainder of the seed disk assembly cavity **78**. In this way, the wiper basket **106** defines a boundary within the seed disk assembly **64** (FIGS. **2** and **3**) between a vacuum zone **128** and a non-vacuum zone **130**. The vacuum zone **128** is defined within the seed disk assembly cavity **78** but outside of the wiper basket **106**. In this way, the vacuum zone **128** is fluidly connected to the vacuum source through the opening **92** between the side plates **88**, **90** of the bracket **84** and/or the openings **96** of the side plate **90** and the spindle **60**. The vacuum source evacuates air from within the vacuum zone **128** which creates a vacuum airflow toward the vacuum source so as to create a vacuum and thus negative pressure within the vacuum zone **128**. The non-vacuum zone **130** is sealed away and mechanically separated from such vacuum pressure by the engagement of the edges **124**, **126** or other portions of the side walls **114**, **116**, and the seed disk **76** rotates past and wipes over the wiper basket **106**. The non-vacuum zone **130** may define a cutoff chamber at which the seeds may freely fall away from the seed pockets **80** of the seed disk **76** to a vacuum holding force at the non-vacuum zone **130**.

Referring now to FIG. **5**, the wiper basket assembly **82** is mostly identical to those described with respect to FIGS. **2-4**, whereby such descriptions are applicable here with respect to the wiper basket assembly **82** of FIG. **5**. The wiper basket assembly **82** of FIG. **5** also includes a blocking plate **132** that is arranged within the non-vacuum zone **130**. The blocking plate **132** is arranged adjacent the wiper basket **106**, shown as being downstream of the wiper basket **106**, and is supported on the plate **100** of the bracket **84**. The blocking plate **132** has an outwardly facing surface **134** that is substantially flat and

is in face-to-face engagement with the inwardly facing surface of the seed disk **76** and which may be made from a polymeric and/or elastomeric material that can seal against the seed disk **76**. In this way, the blocking plate **132** may block vacuum leakage through holes of the seed disk that are not covered by seeds in the seed pockets **80**, after the seeds have fallen out of the seed pockets **80** when aligned with the wiper basket **106** that is vented to atmosphere through the wiper basket cavity **118**. In this embodiment, a vent tube **136** extends from the wiper basket **106** to a location at an ambient pressure, so as to vent the basket cavity **118** to ambient pressure for providing ambient pressure within the basket cavity **118**. The vent tube **136** has a longitudinally extending bore, a first end **138** that is fluidly connected to the basket cavity **118**, and a second end **140** that is fluidly connected to a location at ambient pressure, for example, the meter housing cavity **46** or a location outside the seed meter **34** to provide such venting.

In light of the above, during use of the seed meter **34**, seed is delivered from the seed hopper **32** (FIG. **1**) through the seed opening **50** (FIG. **2**), and is temporarily held in the meter housing cavity **46** (FIG. **2**) in an area that is confined by the divider wall **52** and seed disc **76** (FIG. **3**). The drive assembly **56** rotates the seed disk assembly **64** at a rotational speed that corresponds to the ground speed of the particular row planting unit **10**. The vacuum source pulls a vacuum airflow from the vacuum zone **128** (FIGS. **4** and **5**) of the seed disk assembly cavity **78**, which is directed through the opening(s) **92**, **96** (FIGS. **2** and **3**) of the bracket **84**, through the seed assembly cover spindle **60** (FIG. **2**), and through the vacuum inlet **58** and vacuum supply hose, to the vacuum source. Seed pockets **80** that rotate into the vacuum zone **128** are subjected to the negative pressure, whereby air is drawn through the seed pockets **80** which pull and hold seeds from the meter housing cavity **46** into the seed pockets **80**. The vacuum pressure holds the seeds in the seed pockets **80** while the seed disk **76** and support plate **66** rotate until the seed pockets **80** rotate into the non-vacuum zone **130**, at which point the pockets **80** are no longer subjected to the vacuum pressure inside of the seed disk assembly **64**. Ambient air or air at greater than ambient pressure of the seed disk assembly cavity **78** flows into the non-vacuum zone **130** through the holes of the empty pockets **80** and may also leak past the seeds within the pockets **80** into the wiper basket cavity **118** and/or through the vent tube **136**. This removes the vacuum pressure at the non-vacuum zone **130** that holds the seeds in the pockets **80**, and the seeds fall from the pockets **80** by gravity through the seed outlet **55**A and seed tube **55**B (FIGS. **1** and **4**) and into the seed bed.

Many changes and modifications could be made to the invention without departing from the spirit thereof. The scope of these changes will become apparent from the appended claims.

We claim:

1. A seed meter, comprising:

a housing assembly defining a housing cavity; and

a seed disk assembly that is arranged for rotation inside of the housing cavity, the seed disk assembly including,

a rotatable support plate having a back wall including an inwardly facing surface;

a rotatable seed disk that has an inwardly facing surface and that is mounted to the support plate so as to define a seed disk assembly cavity between the inwardly facing surfaces of the support plate back wall and the seed disk; and

a wiper basket arranged within the seed disk assembly cavity and engaging the inwardly facing surface of the seed disk so as to create a seal that separates the seed disk assembly cavity into a vacuum zone in which a vacuum pressure is present in the seed disk assembly cavity for holding seeds against the seed disk and a non-vacuum zone in which the seeds are isolated from the vacuum pressure;

wherein the wiper basket is maintained in a fixed position within the seed disk assembly cavity as the support plate and the seed disk rotate.

2. The seed meter of claim **1** wherein the housing assembly includes a spindle that is hollow and connected to a vacuum source and that extends inwardly into the housing cavity to a location within the housing cavity that is spaced from the wiper basket.

3. The seed meter of claim **2** wherein the seed disk assembly is mounted for rotation with respect to, and operably connected to, the spindle so that a vacuum airflow that is created by the vacuum source is drawn from the vacuum zone of the seed disk assembly and through the spindle of the housing assembly and wherein the wiper basket is arranged within the housing cavity so as to block the vacuum airflow at the non-vacuum zone.

4. The seed meter of claim **3** wherein the wiper basket is fixed with respect to the spindle so that the seed disk assembly slides across the outwardly facing edges of the wiper basket when the seed disk assembly rotates.

5. The seed meter of claim **4** wherein each of the outwardly facing edges of the wiper basket includes a seal that engages the inwardly facing surface of the seed disk.

6. The seed meter of claim **1** wherein the seed disk assembly support plate includes a collar that extends in an axial direction from an outer perimeter of the support plate back wall and the seed disk is mounted to the collar such that a boundary of the seed disk assembly cavity is defined between the seed disk, the support plate back wall, and the support plate collar, and wherein the wiper basket is nested within and spaced radially from the collar.

7. The seed meter of claim **6** wherein the wiper basket includes a curved side wall that is generally parallel to and spaced radially from the support plate collar.

8. The seed meter of claim **6** wherein the wiper basket includes multiple interconnected side walls that extend generally perpendicular with respect to the seed disk and wherein the outwardly facing edges of the wiper basket are defined at the side walls.

9. The seed meter of claim **1** further comprising a bracket that is arranged and fixed within the seed disk assembly cavity and that supports the wiper basket and at least one spring that is arranged between the bracket and the wiper basket so as to bias the wiper basket against the inwardly facing surface of the seed disk.

10. The seed meter of claim **9** wherein the wiper basket includes a back wall that is arranged generally parallel to and spaced from the seed disk and multiple interconnected side walls that extend from the wiper basket back wall toward the seed disk and a basket cavity is defined between the interconnected side walls and back wall of the wiper basket.

11. The seed meter of claim **1** further comprising a bracket that is fixed within the seed disk assembly cavity and that supports the wiper basket, the bracket including at least one arm that is arranged to push the wiper basket against the inwardly facing surface of the seed disk.

12. A seed meter, comprising:

a housing assembly defining a housing cavity therein and including a spindle that is hollow and connected to a vacuum source, the spindle extending into the housing cavity; and

a seed disk assembly arranged for rotation inside of the housing cavity, the seed disk assembly including,

a rotatable support plate having a back wall including an inwardly facing surface and a collar that extends from a perimeter of the inwardly facing surface of the back wall;

a rotatable seed disk having an inwardly facing surface and being mounted to the support plate collar such that a seed disk assembly cavity is defined between the inwardly facing surfaces of the seed disk and the support plate back wall, the seed disk having multiple seed pockets that are spaced from each other and that include holes extending from the seed pockets through the seed disk to allow for vacuum airflows to be drawn through the holes so as to hold seeds in the seed pockets by vacuum;

a bracket arranged in the seed disk assembly cavity in a fixed position with respect to the spindle and has an opening in fluid communication with the spindle for conveying a vacuum airflow from the seed disk assembly cavity into the housing assembly spindle; and

a wiper basket engaging the inwardly facing surface of the seed disk and arranged to cover multiple holes of the seed disk simultaneously so as to create a seal separating the seed disk assembly cavity into a vacuum zone in which a vacuum pressure is present in a first set of multiple seed pockets for holding seeds against the seed disk at the first set of multiple seed pockets and a non-vacuum zone defined by a second set of multiple seed pockets exposed to at least one of an ambient pressure and a greater than ambient pressure such that the seeds are isolated from the vacuum pressure;

wherein the wiper basket is maintained in a fixed position within the seed disk assembly cavity as the support plate and the seed disk rotate.

13. The seed meter of claim **12** wherein the wiper basket includes multiple interconnected side walls that extend generally perpendicular with respect to the seed disk and that define a basket cavity therebetween and wherein the basket cavity overlies the holes of the non-vacuum zone.

14. The seed meter of claim **13** wherein the wiper basket side walls include outwardly facing edges that engage the inwardly facing surface of the seed disk.

15. The seed meter of claim **14** wherein each of the outwardly facing edges of the wiper basket includes a seal that engages the inwardly facing surface of the seed disk.

16. A seed meter, comprising:

a housing assembly defining a housing cavity therein, the housing cavity being substantially maintained at ambient pressure and including a hollow spindle and being connected to a vacuum source, wherein the spindle extends into the housing cavity; and

a seed disk assembly arranged for rotation inside of the housing cavity, the seed disk assembly including,

a rotatable support plate having a back wall and a collar extending from a perimeter of the back wall;

a rotatable seed disk mounted to the support plate collar such that the support plate and the seed disk of the seed disk assembly rotate in unison with each other, the seed disk and the support plate back wall defining a seed disk assembly cavity therebetween, the seed disk having seed pockets that include holes extending through the seed disk in an axial direction;

a bracket arranged in the seed disk assembly cavity in a fixed position with respect to the spindle, the bracket having an opening that is in fluid communication with the spindle for conveying a vacuum airflow from the seed disk assembly cavity into the housing assembly spindle and a wiper seal support wall extending generally transversely between the seed disk and the support plate back wall; and

a wiper basket maintained in a fixed position within the seed disk assembly cavity as the support plate and the seed disk rotate and including a back wall arranged generally parallel to and spaced from the seed disk and multiple interconnected wiper basket side walls that extend from the wiper basket back wall toward the seed disk, the interconnected side walls and back wall of the wiper basket defining a basket cavity therebetween, wherein the wiper basket side walls have outer edges that define a periphery about an opening that extends into the basket cavity and the wiper basket side wall outer edges engaging the seed disk so as to create a seal that separates the seed disk assembly cavity into a vacuum zone that is arranged outwardly of the wiper basket side wall outer edges so as to provide vacuum pressure to seed pockets that are arranged outwardly of the wiper basket for holding seed in the seed pockets and a non-vacuum zone that is arranged inwardly of the wiper basket side wall outer edges so that air from the housing cavity can flow through the seed pockets that are aligned with the non-vacuum zone so that a pressure within the non-vacuum zone is greater than a pressure within the vacuum zone, whereby seeds cannot be held by vacuum at seed pockets that are aligned with the wiper basket.

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